

985

Notes

Glass Mts

1965

Check - There may 2 colls marked
7312 - if so the fusulinids
should be 7302.

Apple Ranch 1029

Bill Neal Member 996

Blocks 1035

Cathedral Mtn. 1013

Dugout Mtn 1015

Fault NE of Hess R 990

Gilliland Canyon, junction with Road Canyon 994

Gilliland Canyon, S. end 998

Hess, S of 702C 996

Hess Ranch Horst 1004

Hill 5021 1006

5280 1000

5801 1006

Huaco Mtns. 1041

King loc. 104 - Fault 1003

Lenox Hills - East end 1007

" " - South end 1010

Ojo Bonito 1037

Old Payne Ranch 1018

Road Canyon - mouth 1004

Road Canyon - N of Leonard Mtn. 1031

Road Canyon - West end 1014

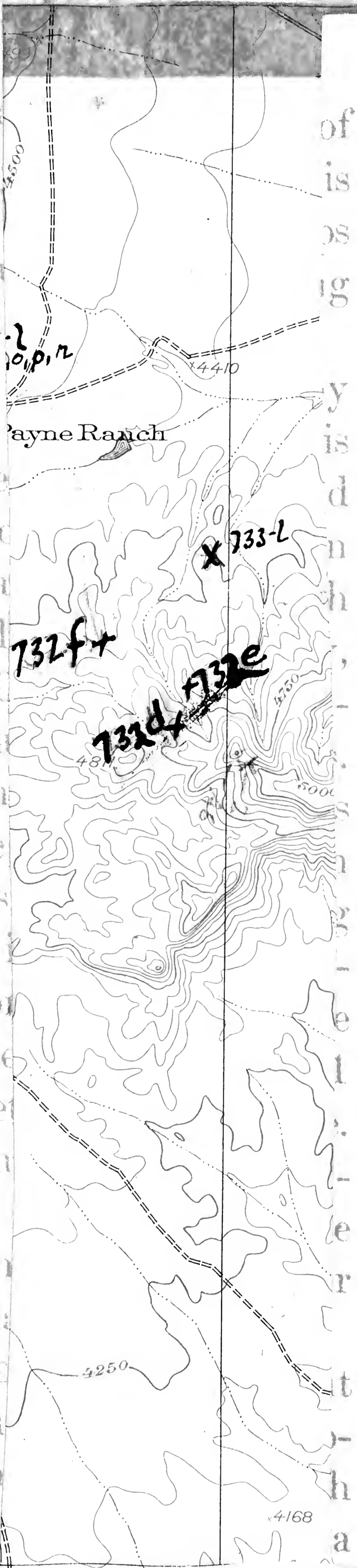
Sullivan Peak 1010

985

1

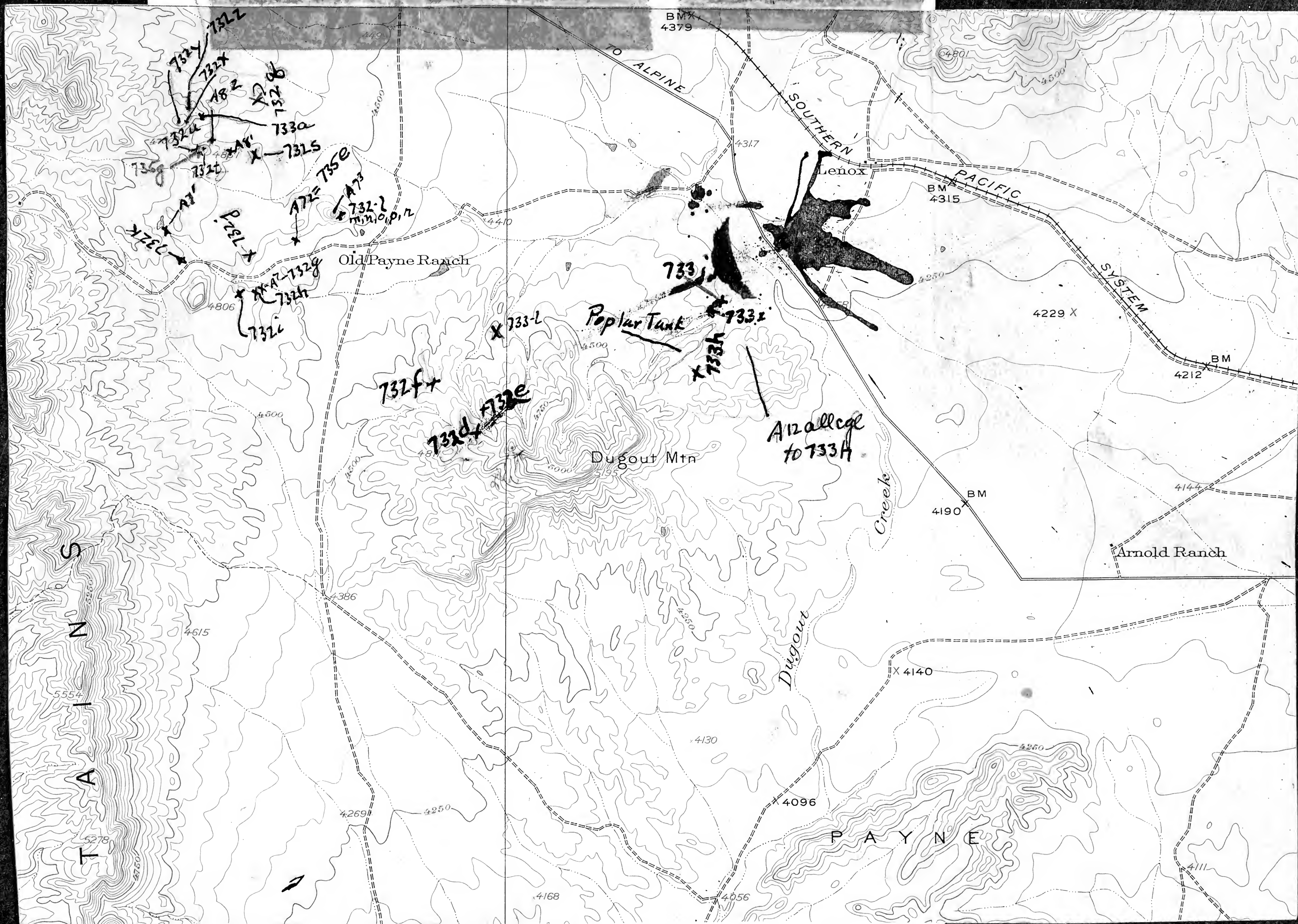
7322

es. The spurs of
The hill at the
steep scarp, from
Inclined tablelands.
On the main
ly beneath its
vertical distance
stated at the bottom
g to the topography
may be as small
as great as 250
more easily certain
heavier than the
ing altitude. The
tions, summits, shown
on the map
foot only. More
s are given in the
ling. The geodesic
erse stations are a
man are shown in
te, county, city, la
by continuous
Public roads shown
e year are shown
l private roads



A survey of Puerto Rico
the published maps is $\frac{1}{30,000}$.
The features shown on top
three groups—(1) water, in
swamps, and other bodies
mountains, hills, valleys, and
(3) culture (works of man),
roads, and boundaries. The
features are shown and explained
some earlier maps, and added
some special maps.
All the water features are
streams and canals by single
by double lines. The large
accentuated by blue water
streams—those whose beds are
are shown by lines of blue dots.
Relief is shown by contour
maps are supplemented by
thrown from the northwest
purpose of giving the appearance
the interpretation of the contour
seems an imaginary line on
of which is at the same altitude
could be drawn at any altitude
tours at certain regular intervals
datum or zero of altitude of the
sea level. The 20-foot contour

7322



April 1.

3.5

4.0 to 7246.

4.75 to Road bend



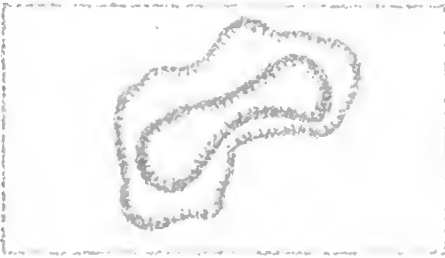

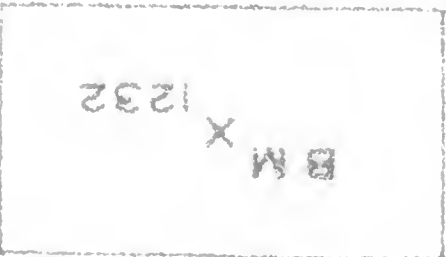
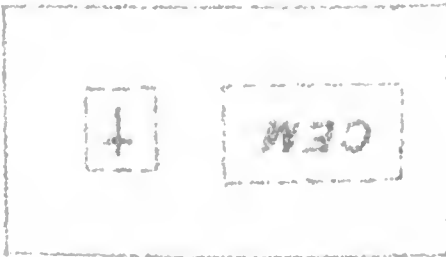


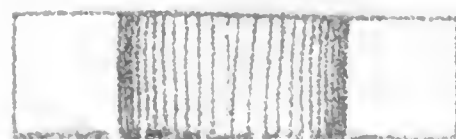
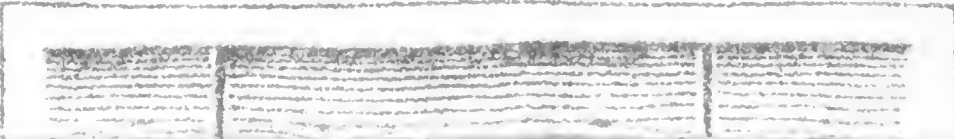


Sight on end of outcrop N 30° W

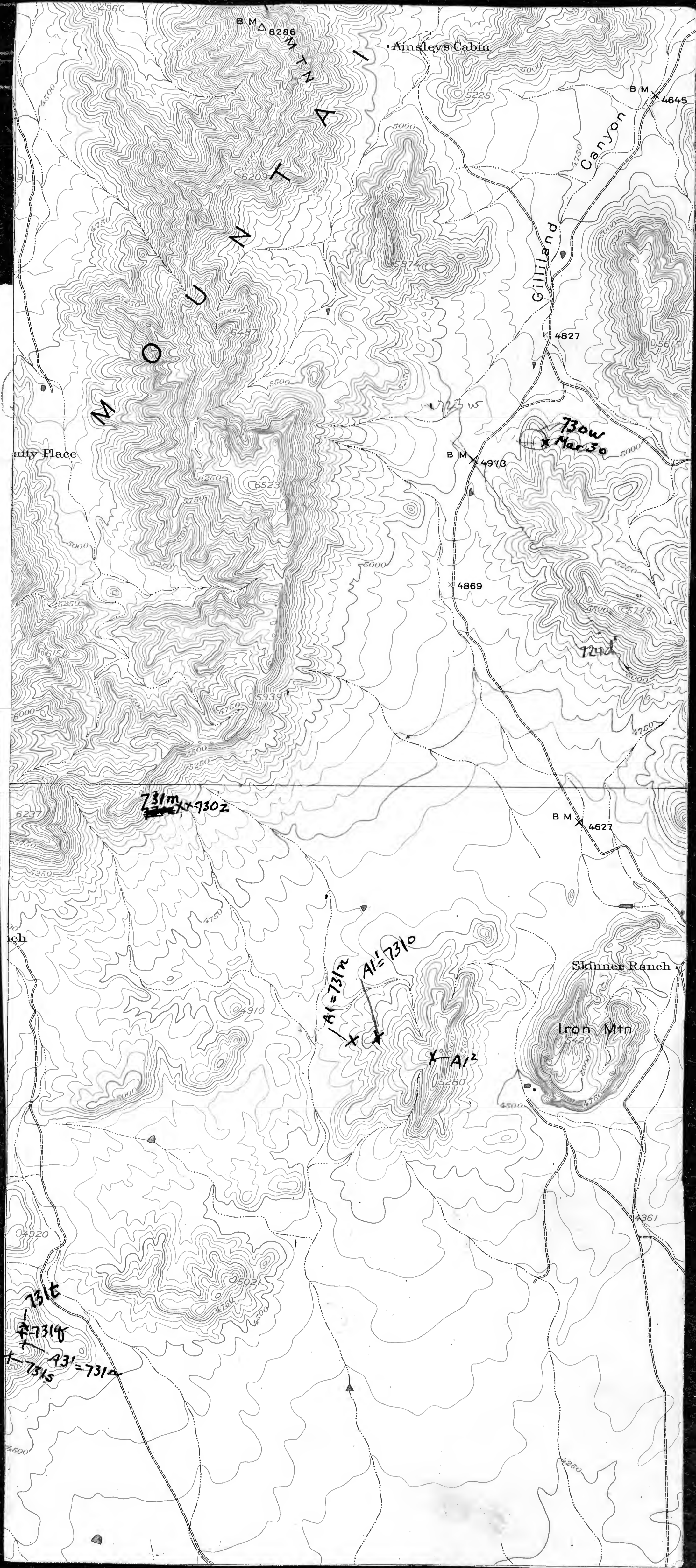
2

of the particular area mapped. with a contour interval of 1 to 100 feet, according to the relief of the particular area mapped.

2. Surveys of areas in which there are problems of average public importance, such as most of the basin of the Mississippi and its tributaries, are made with sufficient detail to be used in the publication of maps on a scale of $\frac{1}{62,500}$ (1 inch=nearly 1 mile), with a contour interval of 10 to 100 feet.

3. Surveys of areas in which the problems are of minor public importance, such as much of the mountain or desert region of Arizona or New Mexico, and the high mountain area of the northwest, are made with sufficient detail to be used in the publication of maps on a scale of $\frac{1}{125,000}$ (1 inch=nearly 2 miles) or $\frac{1}{250,000}$ (1 inch=nearly 4 miles), with a contour interval of 20 to 250 feet.

 Elevation above mean sea level (in black on recent maps)	 Contours (Contours showing depth of water printed in blue)	 Depression contours
RELIEF (printed in brown)		
 Boundary	 Bench mark	 Cemeteries
 Monument (supplementary bench marks shown by cross and blue figures without lettering)	 Church, School, Col (distinguished on recent maps)	 Ford
 Dam with lock	 Canal lock U.S. tow	 Ditch



MOUNTAIN

Gilliland Canyon

730w
X Mar 30

731m
X 7302

A1=731m
A1=7310
X-A1/2

Skinner Ranch

Iron Mtn

731e

731g

731s

A1=731e

780
550

120

352

987

③

two
partly
ley is
illies.
slop-

Cash, Utah, 1937
addressed to

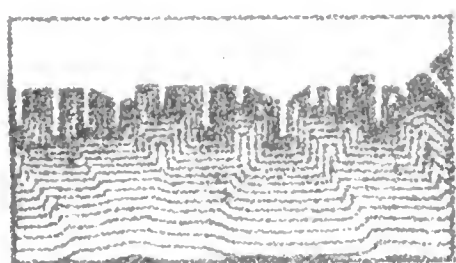
THE DIRECTOR,
United States Geological Survey

November 1937.

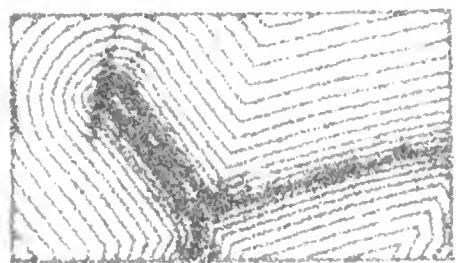
Effective on and after October 1, 1946, the price of
quadrangle maps will be 20 cents each, with a discount of
amounting to \$10 or more at the retail rate.



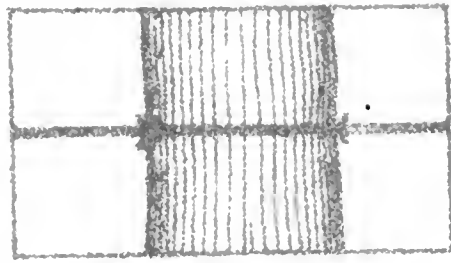
Depression



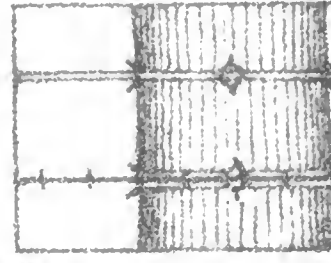
Wharves



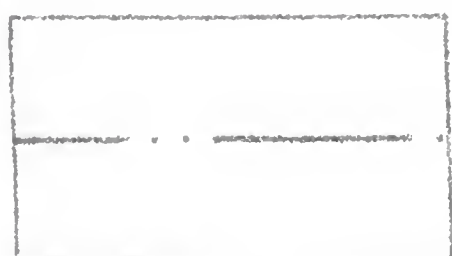
Breakwater
and jetties



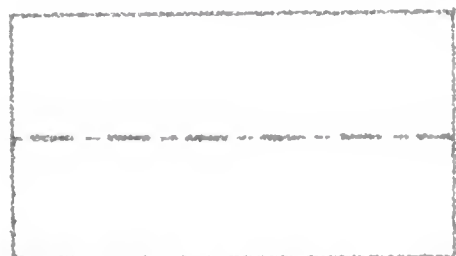
Bridge



Drawbridge



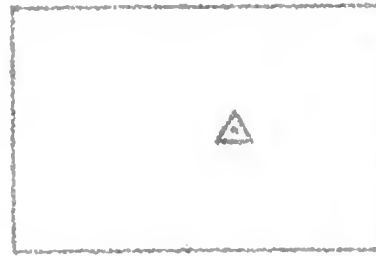
Land grant
line



City, village, or
borough line



Small park or
cemetery line



Triangulation
point or traverse
station



Shaft



Mine tunnel

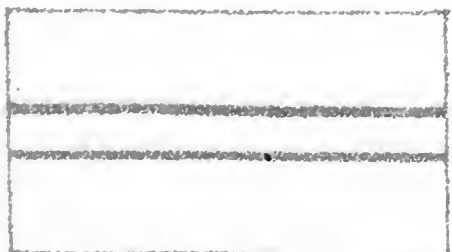


Mine tunnel
(showing direction)



Lighthouse
or beacon

WATER
(printed in blue)



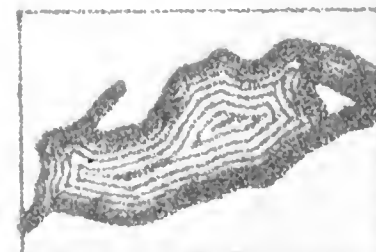
Canals or
ditches



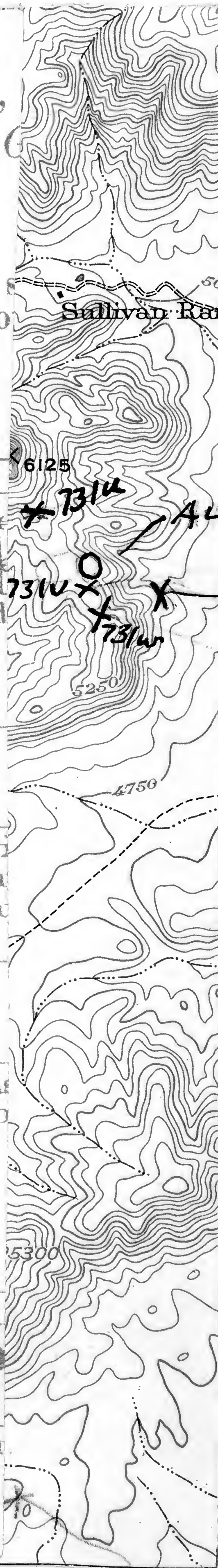
Aqueducts or
waterpipes



Aqueduct
tunnels

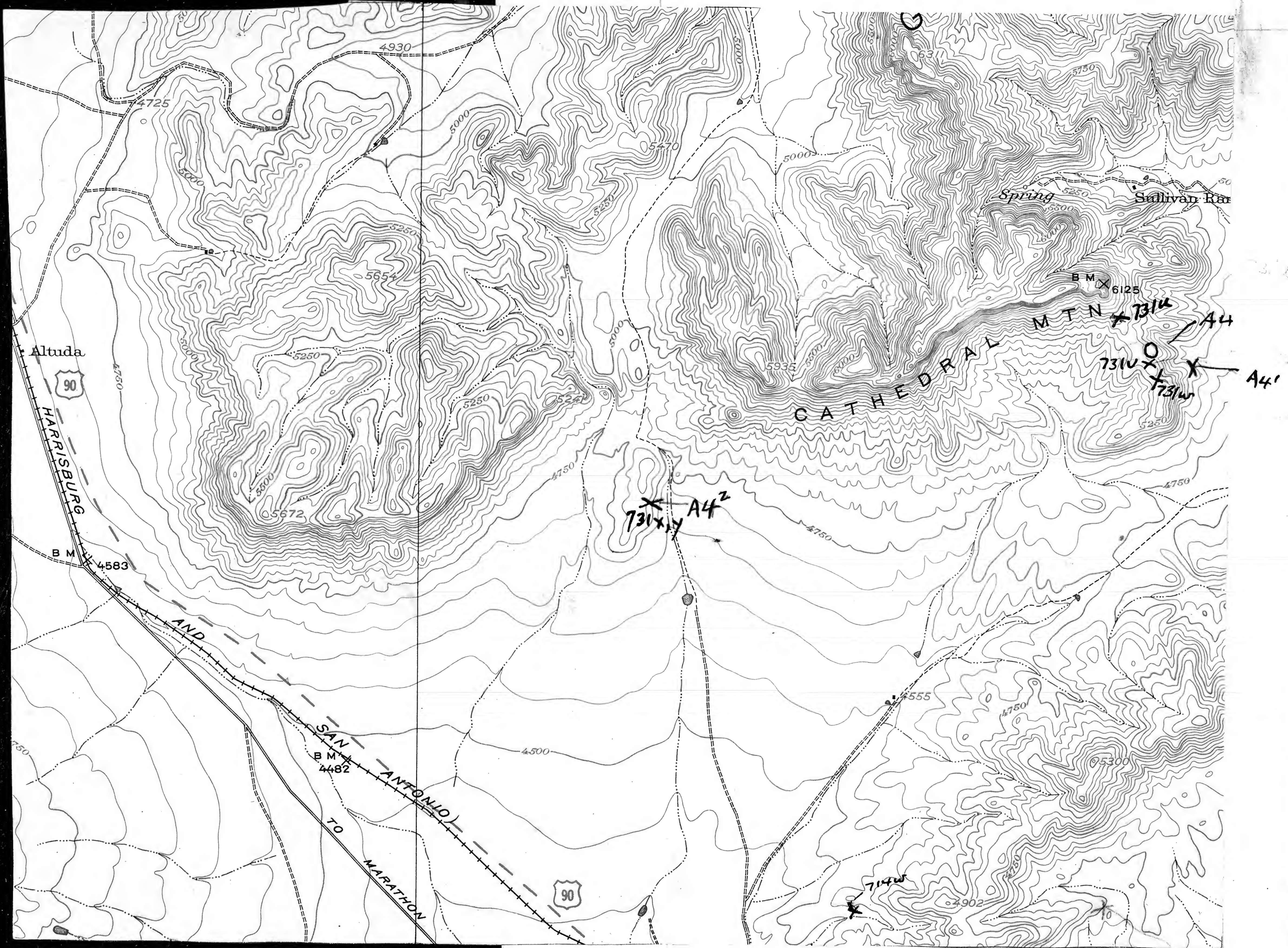


Lake or
pond



987

3



$$\begin{array}{r} 2 \\ 5280 \\ \hline 47520 \end{array}$$

$$\begin{array}{r} 1005 \\ 220 \\ \hline 1225 \\ 2\frac{1}{2} \\ \hline 360 \end{array}$$

6.9

0.9 mile



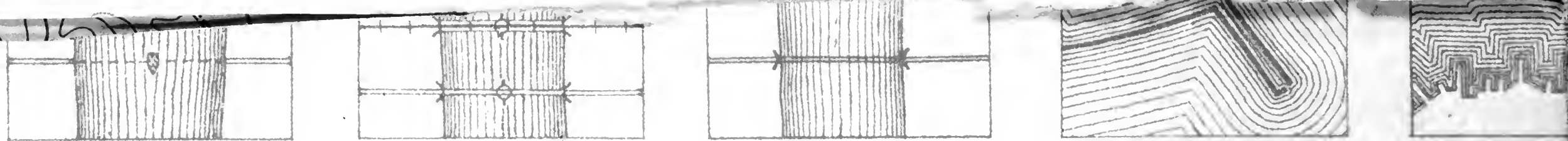
4752'

size of the folio. A circular describing the folios will be sent on request. Applications for maps or folios should be accompanied by cash, draft, or money order (not postage stamps) and should be addressed to

THE DIRECTOR,

United States Geological Survey,
Washington, D. C.

November 1937.

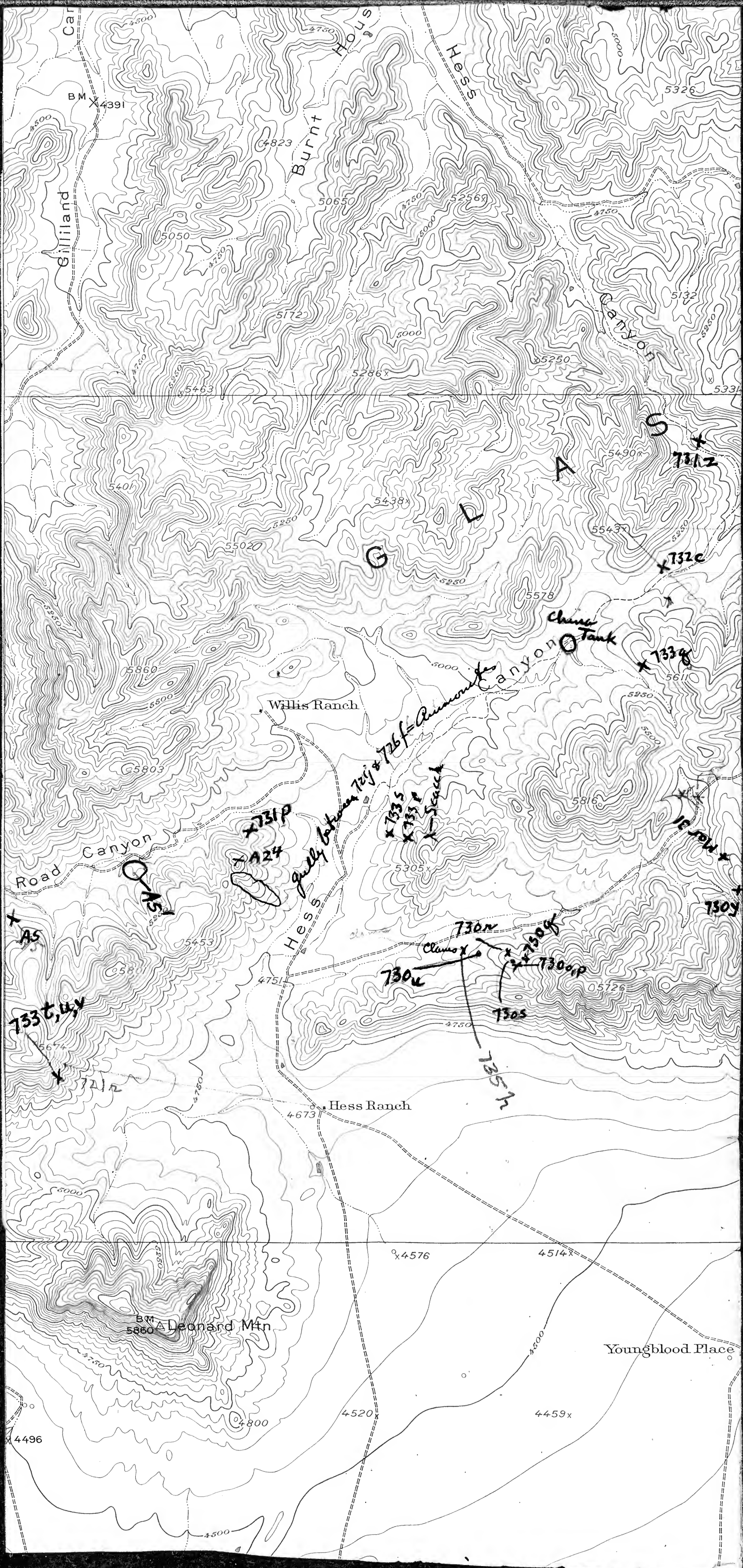


points—such as road intersections, summits, surfaces of lakes, and benchmarks—are also given on the map in figures, which show altitudes to the nearest foot only. More precise figures for the altitudes of benchmarks are given in the Geological Survey's bulletins on spirit leveling. The geodetic coordinates of triangulation and transit-traverse stations are also published in bulletins. Lettering and the works of man are shown in black. Boundaries, such as those of a State, county, city, land grant, town-ship, or reservation, are shown by continuous or broken lines of different kinds and weights. Public roads suitable for motor travel the greater part of the year are shown by solid double

886

4

4.3



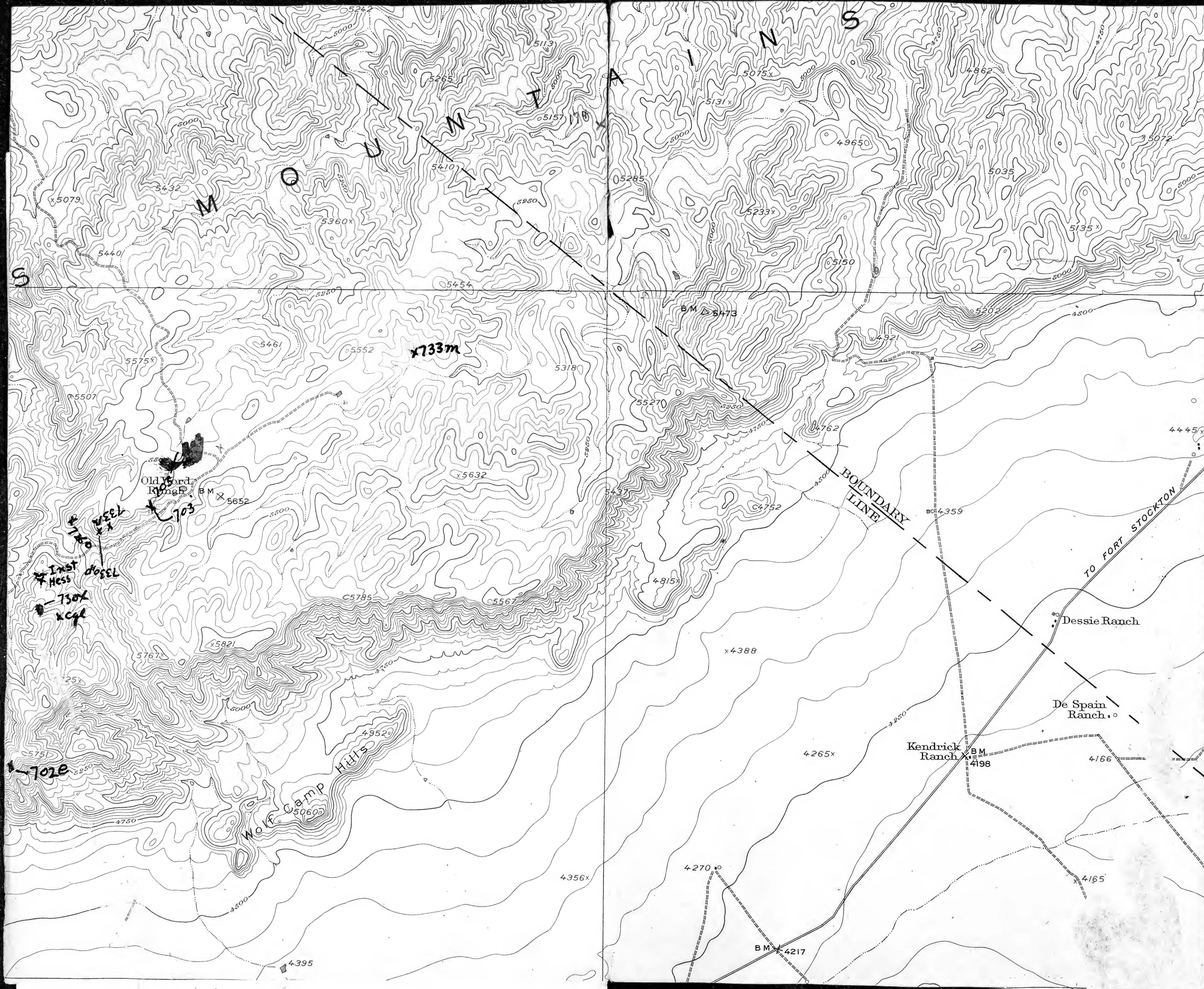
Relief is shown by contour lines in brown, which on a few maps are supplemented by shading showing the effect of light thrown from the northwest across the area represented, for the purpose of giving the appearance of relief and thus aiding in the interpretation of the contour lines. A contour line represents an imaginary line on the ground (a contour) every part of which is at the same altitude above sea level. Such a line could be drawn at any altitude, but in practice only the contours at certain regular intervals of altitude are shown. The datum or zero of altitude of the Geological Survey maps is mean sea level. The 20-foot contour would be the shore line if the sea should rise 20 feet above mean sea level. Contour lines

are shown by lines of blue dots and dashes.

of 20 to 250 feet.

The aerial camera is now being used in mapping. From the information recorded on the photographs, planimetric maps which show only drainage and culture, have been made for some areas in the United States. By the use of stereoscopic plotting apparatus, aerial photographs are utilized also in the making of the regular topographic maps, which show relief as well as drainage and culture.

A topographic survey of Alaska has been in progress since 1898, and nearly 44 percent of its area has now been mapped. About 15 percent of the Territory has been covered by maps on a scale of $\frac{1}{500,000}$ (1 inch = nearly 8 miles). For most of the remainder of the area surveyed the maps published are on a scale of $\frac{1}{250,000}$ (1 inch = nearly 4 miles). For some areas of particular economic importance, covering about 4,300 square miles, the maps published are on a scale of $\frac{1}{62,500}$ (1 inch = nearly 1 mile or larger. In addition to the maps



S

M

O

U

N

T

A

N

S

x733m

Old Ford Ranch

x703

Inst Hess

x730x

x494

x702e

Wolf Camp Hills

BOUNDARY LINE

TO FORT STOCKTON

Dessie Ranch

De Spain Ranch

Kendrick Ranch

BM 4198

BM 4217

4395

4356x

4270

4265x

x4388

5113

5157

5410

5250

5454

5360x

5461

5552

5575x

5507

BM 5652

x5632

5318

55270

5233x

BM 5473

4762

C4752

4815x

C5785

C5567

5767x

x5821

4952

50603

5202

5035

4500

4445x

4166

4165

Readings	100	150	200	300	400
1/125 Plus X	F11	12-14	16	18-20	F22
1/125 Kodachrome X	F7 (6-7)	F8 (8-9)	F10 (9-10)	F11	F14 (12-14)
	8	8	11	11	16

5190

218

5408

⑥

990

March 28

Fault

March 28

Arrived Marathon - Noon on Mar 28

7300

15-20' of biohermal beds C. 17

fossils: *Rhipidomella hesperia*

Eryniostrophia = 7300

730p x fusulines 730p at base of heavy beds

Thin-bedded
thinly bedded
light gray ls

730g - *Crinitella* beds on fault

Went on Hess Ranch to north side
low ridge N of Hess Ranch. Examined
the caprocks jutting N from low
hill with two knobs 5050 and 5000.
The rock on these slopes is very
massive and suggests the lower
Shinner Ranch to me. It is much
dolomitized and only fossils seen
are sections of snails and crinoid
stems. Near base of the rock
suggests Shinner Ranch. The rock
extends to the creek. Saw nothing
to indicate real Hess lithology.
I think the north slope of this
ridge from its west end to the
flat place in the hill 5000' is all
basal Shinner Ranch much
altered by dolomitization probably
from intrusions, one of which occurs
near the end of the long spur

(7)

7300, p. 8.

Went to see fault on NE nose of hill 5250 (contour). The fault is very conspicuous. A long section is exposed on the west face of this hill consisting of a considerable thickness of ribbon-banded, platy light gray-weathering limestone that breaks into plates which litter the slope. Some plates have an orange siliceous skin, and a small amount of siliceous shale appears. This platy material is capped by clastic and biohermal limestone with *Rhipidomella hesseensis* and *Spyridiophora*. Thickness not determined. Above the *Spyridiophora* bed which extend down the slopes of the spur are CM type of beds which are followed by biohermal beds, thickness not yet determined which belong to my locality 708 = *Constitella* beds. I think we have here a passage interval to the Hess; The platy beds representing middle Skinner Ranch passing into Hess lithology and then up Skinner Ranch with *Spyridiophora* = to the Bell Neal Member.

992

8

March 29

Send Garcia pictures of
Museum exhibits.
N65E 20° N

730r - fusulines + *Epyridiophora*

A - flat bedded ribbon-banded bitumens

B - Coarse calcarenite to mudite
with *R. hesensis* + *Epyridiophora*
fusulines at base

C. Thin bedded somewhat siliceous
shaly ls, yellow weathering

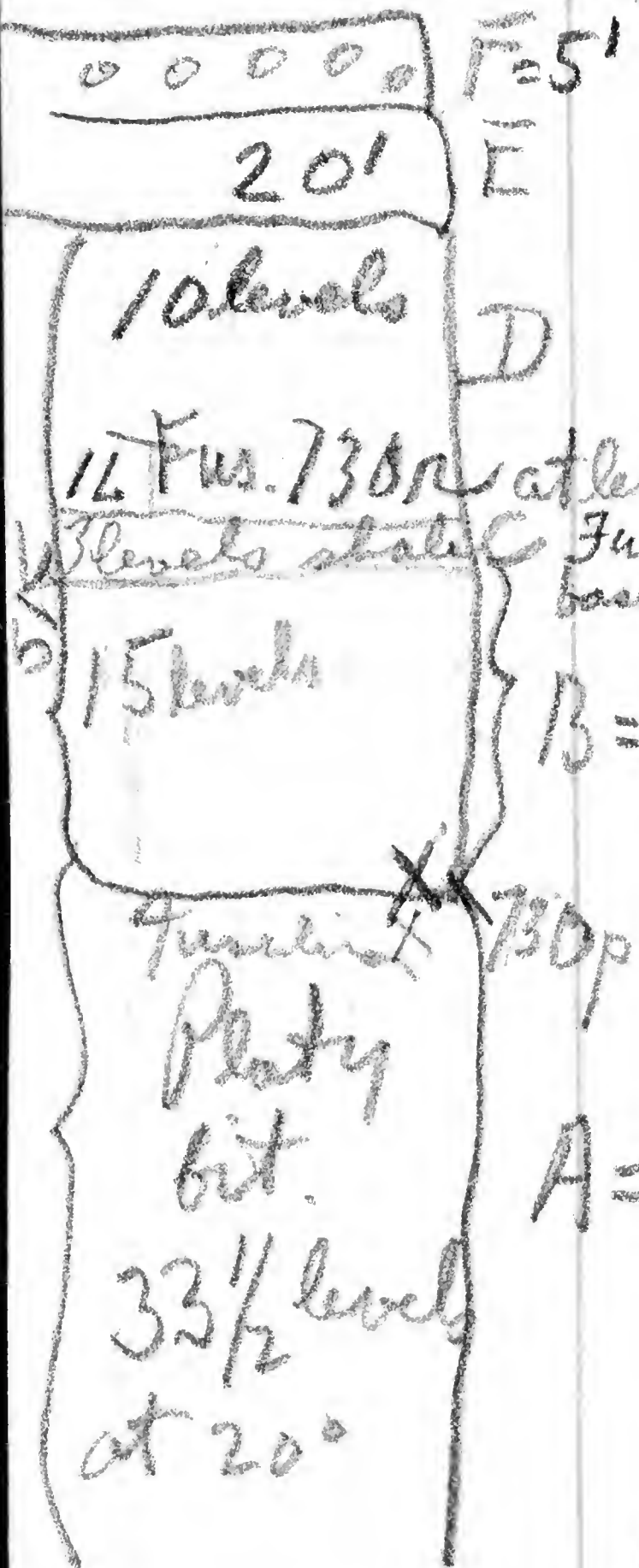
D - Massive calcarenite -
biohermal with *Epyridiophora*

A = 164' Sullivan Peak Equivalent

On top of A are steeply dipping
yellow weathering siliceous ls. very
thin bedded 1/4 - 1/2". Occasional
thin lenses of calcarenite + shell
debris. One thick band 2-3' below
yellow beds, perhaps 10'-15'.

Lowest beds of B are coarse calcarenite
with sp. brownish gray, some
silicified bryozoan & "algal" material
Massive biohermal beds 3'-4' thick.

Total of 29 levels
for Sullivan R = 142'



9

A is on west side hill, lower part of Bon top of hill. One siliceous bed 1' thick with chert and possible sponges.

A bed of yellow platy siliceous limestone in the midst of B is followed by a thick succession of biohermal and massive calcarenite fusulines & *Spindirophora* near base. Extremely massive, showing no bedding. Fusulines in base of thin-bedded = 730t. One big heliosponge and large crinoid stem seen in top beds. Massive beds a pale brownish gray with varying degrees of granularity.

730u 5' F
20' E
10 L x 730n
36 x 730t
730s
15 L B
x 730o
x 730p
Platy beds A

E - Mostly blocky yellow-brown chert ^{siliceous thin bedded} breaking into angular blocks up to 4-8" thick, estimated at 20' and shown in a small draw. Some thin bedded material - looks typical C.R.

F - about 5' small pebble cgl. = 730u - lowest cgl 27' above old road goes up slope as a veneer to 65' above old road. This is only place where it was seen. Pebbles scattered, white, black & red quartz up to 1 1/2" but mostly 1/4" - 1/2". Pebbles well rounded but irregularly shaped.

10

730g - Inuitella beds at fault seem to be a shiver caught in because we could find no base or top to it.

Dick's first measure of BKR came to 130' but measuring across the hill rather than down the hill gave a measure of about 65'. Or half the previous measure. The truth is somewhere between.

730v - Skinner Ranch, side of knob near 730r.

March 30

Word 3 junction Gilliland & Road Anyons

730w

16'	G
15'	F
24'	E
5'	D
6'	C
6'	B
11'	A
83'	

A - massive gray sandy ls with siliceous layers & caps. Wageroceras common

B - covered

C - 6' same as A with Waagen.

D - 5' covered

E 24' of sandy ls in beds 1-3' thick with ammonites, siliceous nodules & siliceous stems.

F covered slope with darker gray ls. pieces

G. somewhat tan-colored sandy limestone few fossils to top of hill. Wageroceras on very top.

(11)

Ammonites occur often in rusty siliceous skins. The striking feature of this section is the almost complete lack of brachiopods and no patches of brachiopods were seen.

Had a futile day because we could not rediscover the 723w locality. It was very foggy and cold; could not locate ourselves because we could not see the topography. Nevertheless it is absolutely clear that the beds on west side of Billiland Canyon are Word #3 and not Word #1. They are more sandy on the west side of the Canyon than on the east but there is considerable sand on the east side. We saw few brachiopods on either side of the Canyon. They are not as abundant as in the Word 3 farther east, i.e. in Hess Canyon.

We visited 721u which is $N 80^{\circ} E$ of hill 4910. 7210 is $N 70^{\circ} E$ and is north of 721u. Fatter place about exhausted.

(12)

7260

Bioherm 18' thick

Going south of 702C, found
Orthis at 1075 paces south +
 Hess lithology at 212 paces.
 At about 300 paces south came
 a limestone cgl. at 375 *Composita*
 in fine grained gray ls. *Composita*
Derbya *Montella* suggests level of
 726m. At 479 paces gray granular ls
 with silicified crinoid debris. 500
 paces came with large crinoid stems
 weathers yellowish. Changes here at
 550 to normal Hess type. To 702
 paces fusulines common in
 platy beds. Congl on inside Amphitheater
 is small pebble quartz and with
 large pieces of limestone

360 paces 520°E of 702C Biohermal
 beds and conglomerate with many
 fossils, *Richthofenids*, *Derbyias*, Also
 much congl. certainly the base
 of the C.M.

M31 - Bill Neal Member? ls cgl.
 about 15' covered, bed with yellow
 chert capped by 10' with crinoid
 stems and large *Spurfin*
Large Pencilauris, chert band

540
2 1/2

270
1080

1350

(13)

disappears in about 100 yards.
 Chert bed picked up again a little
 lower. Crinoidal beds 4' thick in
 places. Fusulines common. Leptoderm.
 Spiridionophora, Penninularia, sponge
 bed with abundance of *Girtycoelia*
 Fossil bed running along crest of ridge
 about 50' below top. Spongy bed some
 50' in length. Crinoidal clay out opposite
 Wend Hill capped 5700' contour,
 opposite Wend 5700' contour

Lghts from 702e

S 60 E of end hill of horst
 N 60 E " highest part of Leonard Mtn
 N 70 W of Wend Hill 5060
 S 80 E Wend hill 5305

702e is 540 paces = 1350' west
 along ridge from divide = $\frac{1}{4}$ mile
 To get to locality follow fence line
 at gate to its intersection with Neal
 cross-fence.

998

(14)

April 1
724 b locality - Road Canyon

A - all but top 5' covered, top 5' with
Thick-bedded chert strongly suggestive
of Leonard

15' C
10' B
27' A

B - biohermal beds thought to be lower
Road Canyon

C. Very thin-bedded, bituminous ls.
with some interbedded chert. Often
weathers yellow. Seema to me to
be good Road Canyon whereas
chert under the bioherms looks
like Leonard.

13 levels at
13° + 1'

Beds above Word 3 very fissile
thin bedded yellow siliceous shale
Top bed of Word 3 has an inch or two
of brown siliceous material. Word #3
is light gray very sandy ls. Occasional
thin beds of chert. Very uniform
lithologically. Irregular sand layers
Fossils rare, scattered, broken.
Occasional layers with quartz pebbles
up to half an inch. Well scattered.
Layer about 65-70' thick.

W₃ at SE end of outcrop: 11 levels at 13°

(15)

731m - large lens of limestone, sandy and silty abounding in fusulinids and other fossils. Weathers yellow gray to rusty. About 3-4' thick. At about same level as 7302 which came from the shale. The lens is 30-35' below Word #3 and seems almost identical to 723W. The lithology is the same and the fossils similar. *Wagenoceras* present.

Under the Word #3 is thin, yellow fissile shale with occasional small limy lenses with fusulinids and other fossils. One of these is 7302 taken from 30' below the Word #3. This shale seems lighter yellow than that of the Leonard and it has no chert in it.

Location of 731m.

S 70 E on igneous knob.

S 55 W on Sullivan Peak

S 30 W on hill 5300

S 60 E on hill (cone) on N side 5280.

Located just before Word 3 goes under the floor. Two patches of Word #3 west of main mass about 0.1 mile.

Follow fence to outcrop; where go thru gate

Hill 5280

(16)

A1 - patch of small pebble conglomerate with *Aglaria* (common) and *Architeles* present.

Dark granular ls with *Perinites*.

3'-4' bed dark detrital ls, with large *Hustedidia*, *Chonosteges*, *Hercosia*, *Aglaria*.

These 3 layers close together and enclosed in a matrix of blocky chert that breaks into rectangular lumps. A double ledge of ls. at about 4850' on slope. Broken shells, dark color with brown silica stain.

CM	
Tony	1' A'
CM	50' B
SK-Tony	3' C
chert	30' D
Tony 15'	E
25' chert	Covered to strata

A1' - Detrital ls (1") above & below and containing *Tonyachus*.

About 50' below this ledge came

Thick limestone. This is a 3' bed with

Tonyachus. About 30' is another massive ls and in between is chert.

This upper bed contains many corals thin and long.

E Thick massive granular ls with scattered quartz pebbles up to 1". It is about 10' thick and contains small corals. Also has thick layers 4-6" of chert. Beneath E is about

Bed C may be 70' of SKR. The chert on it is more orange than that below.

(17)

Bed A' higher up slope near top of hill has *Ancosina* or something new.

A² - Divide between two main gullies has contact of SKR and CM. SKR has siliceous skin and contains *Foryneda*. Very uppermost bed is a cgl. with ls pebbles. Small corals common. Lower quartz pebbles of 1/2 inch are scattered in the rock. Some layers of brown chert appear below the top but all are thin. Large curved stems. *Heliospirigra*.

Limestone appears in the lower 50' of the Cathedral Mtn. but they do not seem typical of CM. Found *Pencillaria* and *Chonetes* but nothing diagnostic. Upper bed 3' thick with a 3' siliceous skin.

We walked the top bed of the SKR from the Mtn top around to our locality A' and the top is actually bed E which has at least 25' of chert under it. It is evident that the cherty beds thin into the mountain to the east. Possibly there is convergence of the *Foryneda* beds toward Leonard Mtn.

(18)

What we saw on hill 5280 suggests that some of the Sk R cherts are pinched out to the east so that the Mountain front presents a complete limy face. Furthermore we found *Trochoceras* common at the top of the Sk R and for some 50' or so below. It also occurs in 2 layers in the beds above it, in what is lithologically like Cathedral Mtn. I suspect that these limestones belong to the Sk R rather than to the beds above. These may converge eastward to make the *Trochoceras* beds on Leonard Mtn.

(19)

April 2 - King locality 104
Dolomite with scattered crinoid debris

On east side of King's 104 we saw evidence of faulting, baked rock, schistone rock, thick calcite veins, color change, dolomitic rock. All this added to a drastic dip change suggests fault. Furthermore, under the cgl. with *Anstitella* comes extremely massive coarse calcarenite that I believe to be Skinner Ranch. The situation seems to be nearly the same as that at 708.

Hess horst at East end

AZ' - The Lanox Hills cgl. crosses the divide just east of the igneous body and the fault is on the S side of the divide. The fault must run along the south side of the igneous body and the east side of the divide. Thus the conical hill must be blocked on 3 sides by faults, the southernmost fault taking in localities King 104 and 708. The fault along the south side of the igneous body must join the fault on the south side. The bulk of the conical hill must certainly be Skinner Ranch (high)

of the conical hill?

(20)

A2³ Hesse Ranch Horst

Fault ~~cross~~ stream on E side conical hill 750 feet upstream from road. Large bioherm at junction of road and mainstream. 2 probable *Ornatella*. Under this a few feet from the road (50') in stream is platy yellow shale. A large *Myallia* clam like *Mione* form. Split *Funk* was seen. The stuff is almost certainly *Ornatella*.

Mouth of Road Canyon on 731 p - very end of hill at E end Road Canyon has a knob of unfossiliferous Word # 3. Under the Word # 3 is a small hump almost completely composed of *Franklinids*. It also contains some brachiopods, *Rehthofia*, *Productids* & large *Dentzia*. This looks like the lens 30' under Word # 3 on Thursday morning 731m. 7 of these lenses below the main knob.

A2⁴ - Word # 3 consisting of blocky light gray sandy limestone with chert nodules and some yellowish chert skins on the blocks 70' thick forming crest of hill. All types of fossils are extremely rare. On slope up to top of hill saw numerous pieces of rock from lenses.

(20)

like those of 731p. There are
full of fusulinids.

Coming down the slope from top
we were impressed by the fact
that the flintish slabs of Word #3 are
mainly confined to the upper slopes
and no yellow shale shows. Where
the slopes flatten the yellow shale
appears but virtually no drift
from Word #3 appears. It is
unlikely that we picked up any
continuation from above.

Continuation may come from
limey lenses just above Road
Canyon but these have mostly
Road Canyon types. At the end
of the outcrop the upper Road
Canyon is sparsely fossiliferous
and is somewhat suggestive of
higher Word.

Pericrinites is on the slope just west
of 721j.

The lower slopes above the Road
Canyon at and around 721j are
covered wholly by shale. No float
from the top appears. It seems
improbable that any Word # has
been picked up as Road Canyon.

(22)

April 2

Section on slope with Perinities
just west of 721j - in Road Canyon

Word	I	A - Bioherms with large
3'	H	Periculams and many fossils
11'	G	B - Bioherms - scattered, poorly exposed.
26'	F	C - fine granular limestone with fusulines and Perinities
11'	E	D - Partly covered slope but with beds a foot or less thick with siliceous skins. About the level of 721j
27'	D	E - Blocky thick-bedded calcarenite with siliceous layers and skins
4'	C	F - Thick bioherm of light gray limestone with scattered fossils. corals common.
16'	B	G - Yellow siliceous shale
11'	A	H - Bed of limestone with abundant fusulinids and other fossils scattered through.
95		I - Word shale

1007

(23)

April 3.

43 = 731g - A lens of detrital limestone with pebbles and shell debris, bituminous. Contains *Spyridiophora*. This is at base of small knob of C. M. 14 ft crinoid stems.

731r = A3' - 10' above top of Sk R (vertically) comes a lens like that of 731g with pebbles of ls broken fossils and huge crinoid stems. It has the aspect of the Sk R. *Spyridiophora* fragments seen. *Xestesia*.

Section uphill at 731r

A - 76 feet of yellow siliceous shale and blocky chert. At top of A is a 9" layer of blocky chert.

B - fine calcarenite with siliceous skins on rock surface (1/2"). Fossils very fragmentary - 1 foot thick.

C - covered.

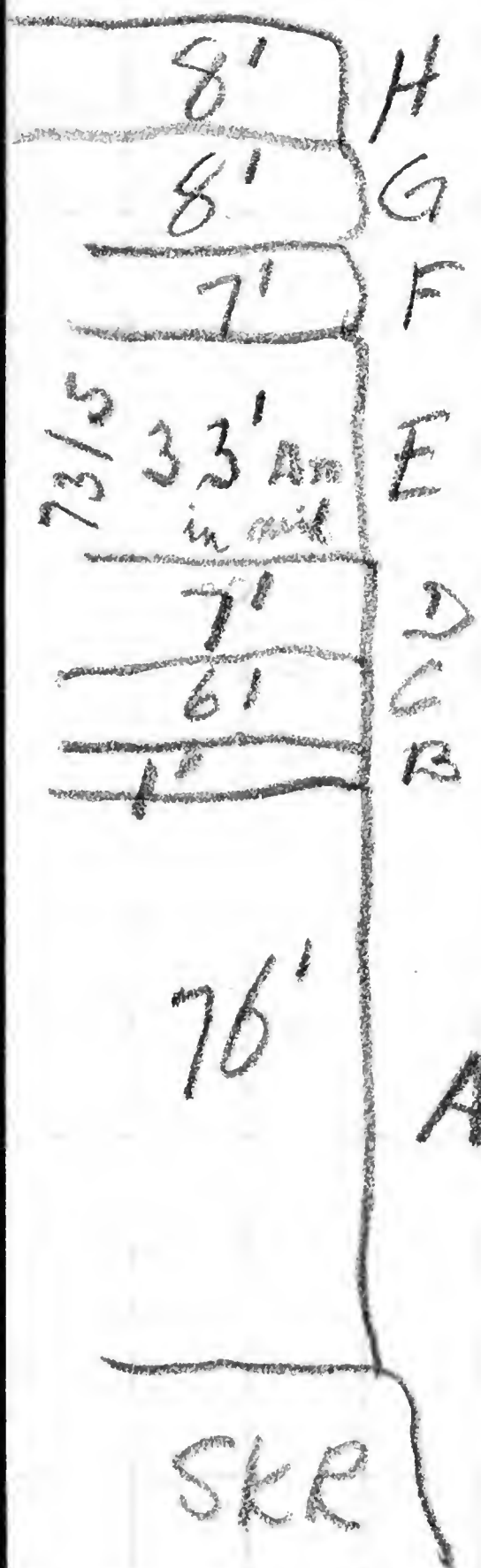
D - Mostly shale and chert, some bedded with a 6" limestone bed at base.

E - Fine grained calcarenite, dark gray in section and weathering. Occasional ammonites. 1" siliceous skin on top.

F - platy hard shale or chert.

G - same but with flat-bedded ls of 1' at base.

H - Gray ls. siliceous skins on some beds.



(24)

Next hill west

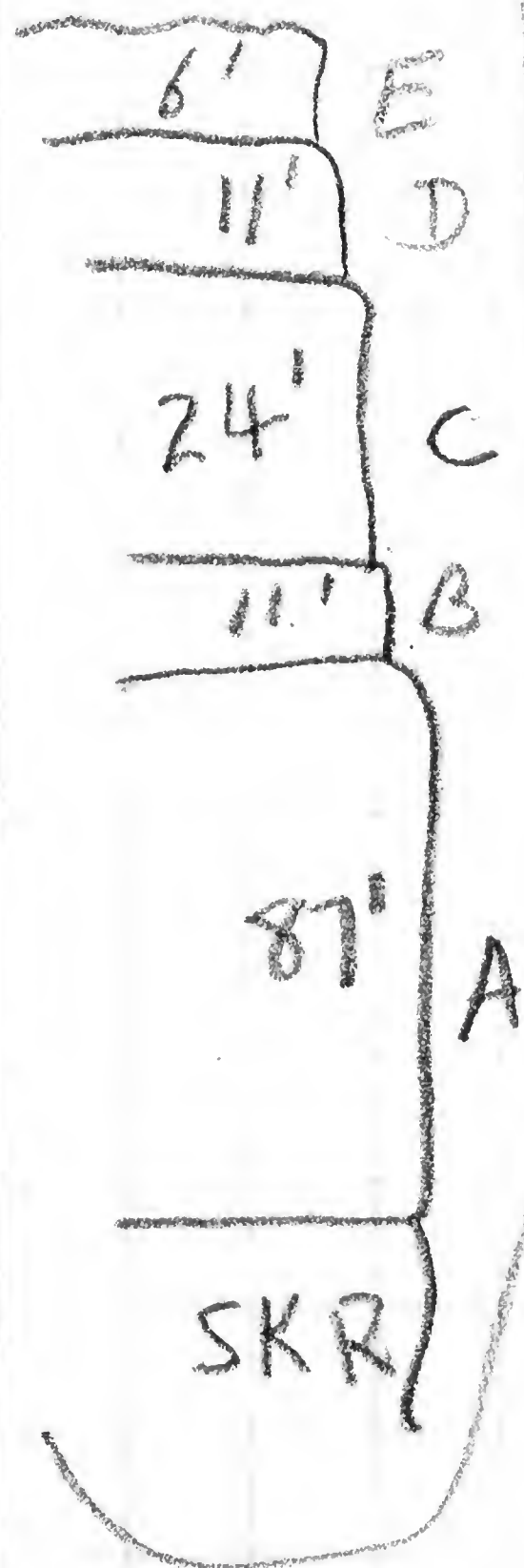
A - chert yellow shale slope mostly covered

B - bottom bed a fossil horizon but mostly chert with another one foot limestone band a foot or two above the lowest one

C - 11' up in C a moderately large *Rhipidomella*. At top thick layers of chert.

D - 11' chert blocky

E - Veneer of limestone, gray like that below occasional ammonites.

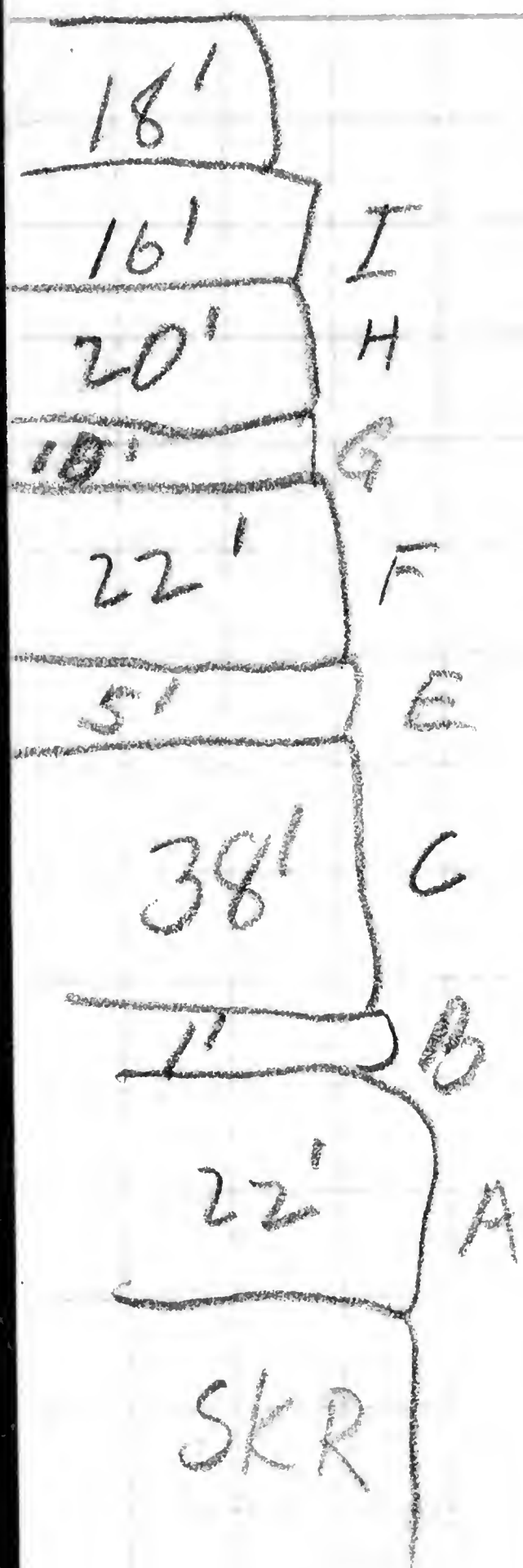


731t - Crest of first and small knob, above 731g is a section of siliceous yellow shale but on every top of knob is a small bioherm with numerous fossils. Stratifera among others. The north slope of the knob has a steeply dipping veneer of probable Leonard #3. This rock is the same lithologically as that on the big hill to the west. We found nothing diagnostic in 731t to place it in the section.

1009

25

N side Hill 5021



A - 22' of yellow siliceous shale

B - 1' lens of detrital ls. *Stenocrinus* (large), 1 1/2" siliceous shims.

C - 38' of shale and layers of blocky chert

E - covered

F - Blocky dolomite with siliceous shims.

G - 10' of irregular greenish gray dolomite with small quartz pebbles - looks like a dolomitized bioherm. Crinoid stem shadows.

H - Massive dolomite beds 3' thick with rounded surfaces but top bed angular and blocky

I - altered blocky chert.

J - 18' of massive tan dolomite with small silica flecks. Fossils in chert shims badly altered.

(26)

Our wanderings of April 3 over the east end of the Lenox Hills did not produce any definite trace of the *Institella* beds. The *Spyridiophora* just above the SKR ⁶ think belongs rather to the SKR than above. The beds at 731t have fossils suggestive of Leonard #2 but we saw nothing to clinch this.

April 4

Lenox Hills - South

714 W - N10W of Pinnacle Hill with Leonard 2. From Hill 5300 have N60E. Locality with *Institella* is south of hill with 714 W. This is probably locality 7235 check. One block numbered this. This must be check in 1963 notes and against collection.

Sullivan Peak

April 4th went up Sullivan Peak. The RC is all of 300' thick. I think its contact with the Word is at saddle at 731W. This is at about 5275' elevation in the saddle. Down slope to east I encountered the bioherms at the base of the RC at about 5000' elevation. These run along the side of the hill for some distance and look like the lower bioherms north west of Hess Ranch.

check
7235

(27)

A - platy yellow shale with pink bands
 B - Solid mass in about two 5 foot layers
 many chert nodules, fusulines (abundant)
 Rhyndopora, Neophria.

C - Thin yellow shale

D - irregularly bedded massive limestone
 with interbeds of yellow chert & shale

E - yellow shale on long slope

F - Thin bedded limestone with
 some swollen parts. Evidently a
 lens.

G - yellow shale - occasional lens of ls.

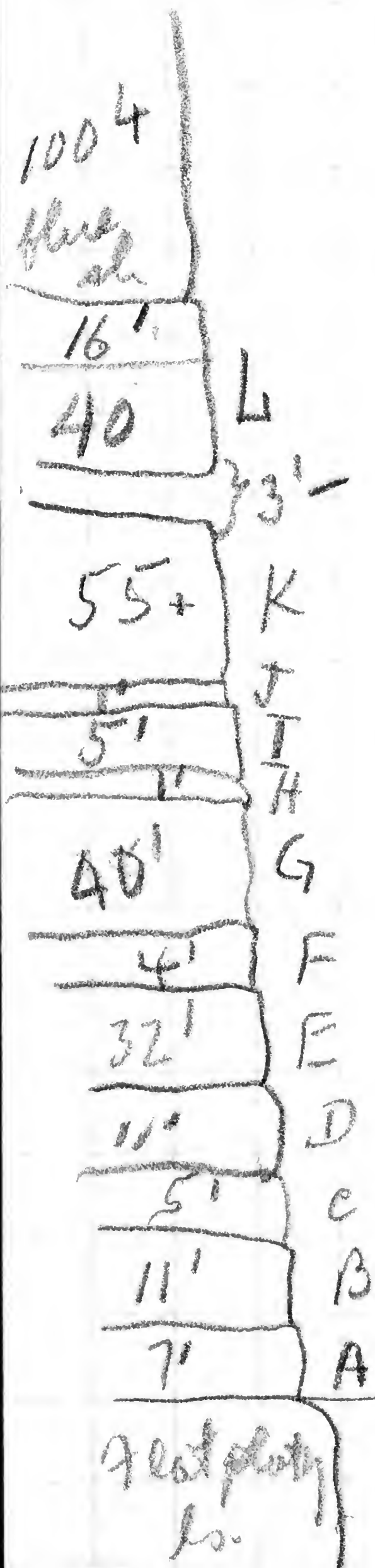
H - yellow dolomite

I - shale

J - dolomite yellow

K - shale

Thicknesses
 here are
 elevation
 not true
 thickness



L - occurs just at base of slope at
 end of long spur at about 5450'
 Here are a series of lenses. Thus 56'
 feet vertical. These have a variety
 of lithologies some are dark bituminous
 others silty and some are made
 up almost wholly of fossils. Some
 are patches (small) of fusulinid debris.
 The top 16' of L has blue shale
 rather than yellow and many of the
 lenses are round

about 5190 elevation

like septaria with
 The cracks filled
 with black tarry calcite. At top of
 L is a bed of black limestone

780
2

1560
390

1950
3284

(28)

Top of L is top of limestone and
 drops one to steep upslope of slope
 into Sullivan peak. It is the very
 base of the hill at about 5510'.
 Above the top of L the slope is
 mostly of blue shale but has
 scattered ls lenses with black
 joints. Small round concretions are
 also present.

554 paces from base of is a
 layer of fusulines = 731v
 780 paces from base of L comes
 contact of shale & ls. of Wood & RC.
 Here no more yellow shale occurs
 This 1950' from base of L. Top
 of RC a great mass of fusulines
 in heavily bedded ls. Overlying
 limestone cgl. = 731w.

A4' at about 3000' contour is a
 ledge of bioherms 10-15' thick with
 numerous sponges and corals that
 look like the basal bioherms of the
 Road Canyon. There are about 250'
 of slope here with RC. = about 250-300'

1013

(29)

A4²

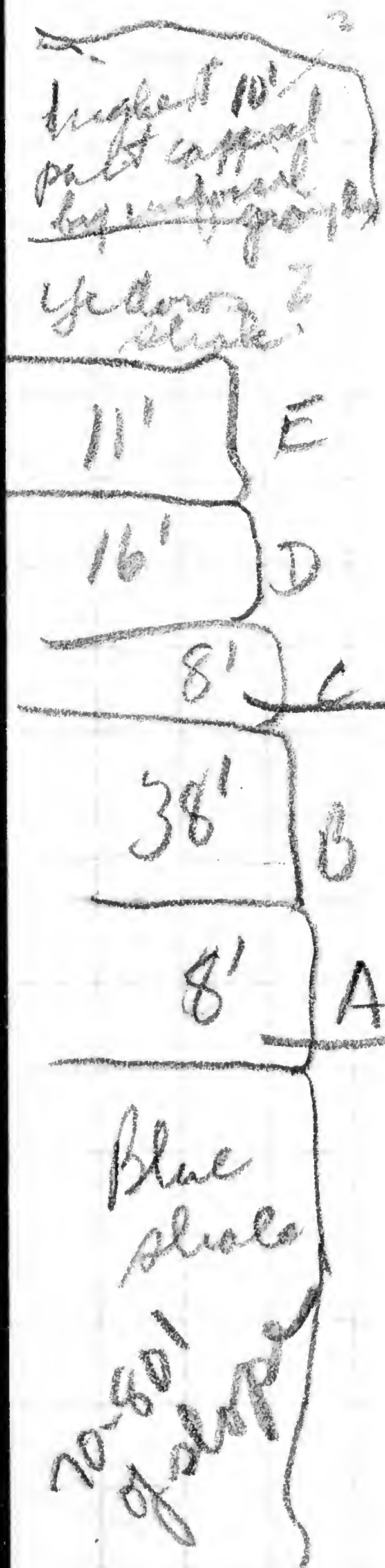
- A - 8' of massive and cobbly ls. almost completely made up of fusulines =
No fusulines in top foot.
B - Shale, chert and thin ss beds, yellow and brown.
C - Massive ls abounding in fusulines

D - Slope of loose rock indicating discontinuous beds of ls sandwiched in between yellow shale + chert. ls with fusulines

E - yellow chert + shale with 2' bed (discontinuous) of ls. at base ✓

731X

731g



(30)

April 5

West end Road Canyon - walked over Word #3. Same sandy limestone but with few fossils. Two general levels of fossils, one near bottom with *Ammonites*, - *Waagenoceras* and *Medlicottia* and straight-shelled nautiloids, common. The upper level mostly brachiopods all badly broken or more fragments. This level also has a fair number of small quartz and other pebbles.

China Fork is exactly 0.6 mile west of middle of divide in Hess Canyon.

7312 - dolomitic limestone, cherty massive with *Linoproductus* & *Spiniferella*. Collecting poor.

732c - small isolated lens above 706b and below Word #4.

1015

(31)

April 6

Dugout Mountain

700m

A6 - round knob with elevation 5000' is Leonard ls #3. Here about 60 feet thick and mostly cgl. at base, with some yellow chert. Fossils badly macerated. *Periculaus* with large wing = 700m

A6 Leonard #2 is on slope just below 3 and is mainly massive ls in the lower 1/2 and mostly massive dolomite in the upper half, all with small quartz pebbles and much fragmented fossils. Estimate it occupies 60' of slope on side of ravine.

732d - A6² N to E of hill 4811 = 3rd limestone

A - 3-4' conglomeratic massive ls. with small pebbles 1/2" and fragmented fossils

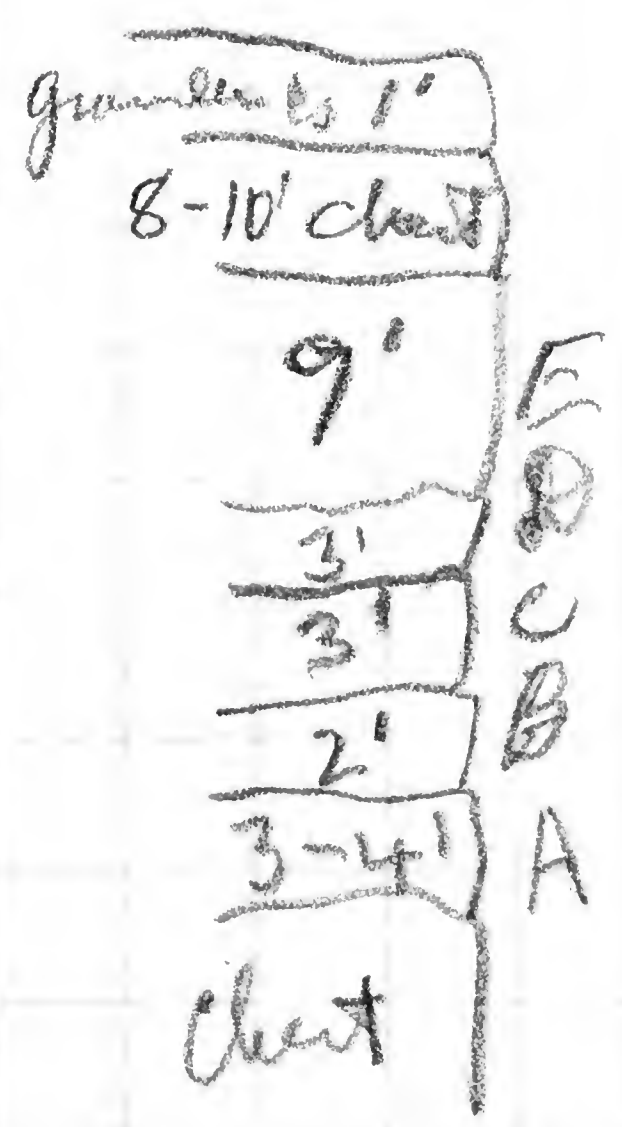
B - covered

C - Thinner bedded cgl. ls.

D - covered

E - Fine calcarenite with broken fossils in lower 3/5 to but top in coarse massive conglomeratic ls. with 2" siliceous skin.

Ornamented *Leptosteges* throughout



1016

(32)

Some of the beds have many sponges.

A6³ 732e - 2nd Leonard ls.

A - Massive fine-grained sandstone with some conglomerate patches.

B - Conglomeratic dolomitic limestone rounded by weathering

C - covered

D - conglomeratic dolomite

E - covered

F - 2' conglomeratic ls

G - chert with occasional ls. lent

H - same to top of hill.

3'	H
2'	G
2'	F
2'	E
3'	D
5'	C
3'	B
7'	A
chert	

Skeletonia in G.

Color 33 is of Leonard #2 on Dugout Mt. Thick ss to lower left.

Slope above 732e contains mostly quartzite

BW26 looks at small knob shows Leonard 3 on crest + 2 below.

(33)

732f- Leonard #4 - a few feet 5-7' of gray granular limestone with rusty speckles on some of the surfaces. Ammonites present. Brachiopods few and mostly a small *Echinauris*. Paucity of fossils is in contrast to beds 2 & 3.

700p = A6* - Revisited Leonard #2 locality on east side of road and found crenulated *Oncosarina* which is common in Leonard #2 and 3 on Leonard Mtn. We did not see it in Leonard #4. Considerable sandstone under cgl. band Leonard #2 has a great variety of lithologies as seen at 732e. The sandstone at its base was not seen elsewhere but much sand exists in the section. Some of the blocky chert seems to be quartzite.

These limestones are clearly related to the Shimmer Ranch and the discovery of *Sacletoria* in both of them clinches it.

1018

34

April 7
NW of Dugout Mtn. near Old
Wayne Ranch.

A7

A - Lower limestone of tier of two
Dark gray, fine grained weathering with
a yellowish gray tinge. Fusulinids
taken from 3' below top = 732g.

B - 18' of brownish yellow shaly rock
looking like Leonard

C - 6' breccium but with few fossils
Some quartz pebbles. 732h - fusulinids

D - cherty yellow rock

E - gray ls. 2'

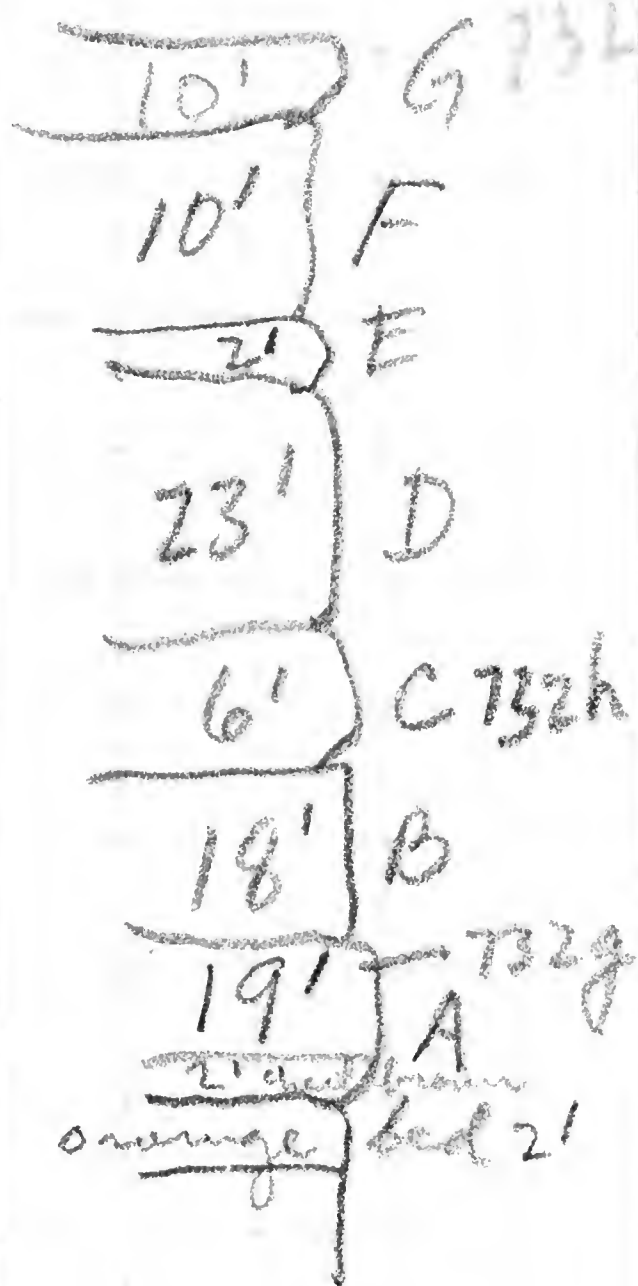
F - yellow chert

G - Calcareous with many fusulines

732i - fossils from G. 732i' is
from top, others from middle

732k - small concretionary patch with
Wagonoceras. Under top hill with
poorly bedded ls.

^{Blue}
A7' - Clay shale with posterior of a
Spinifer. Shale suggests that on Bullman
Peak

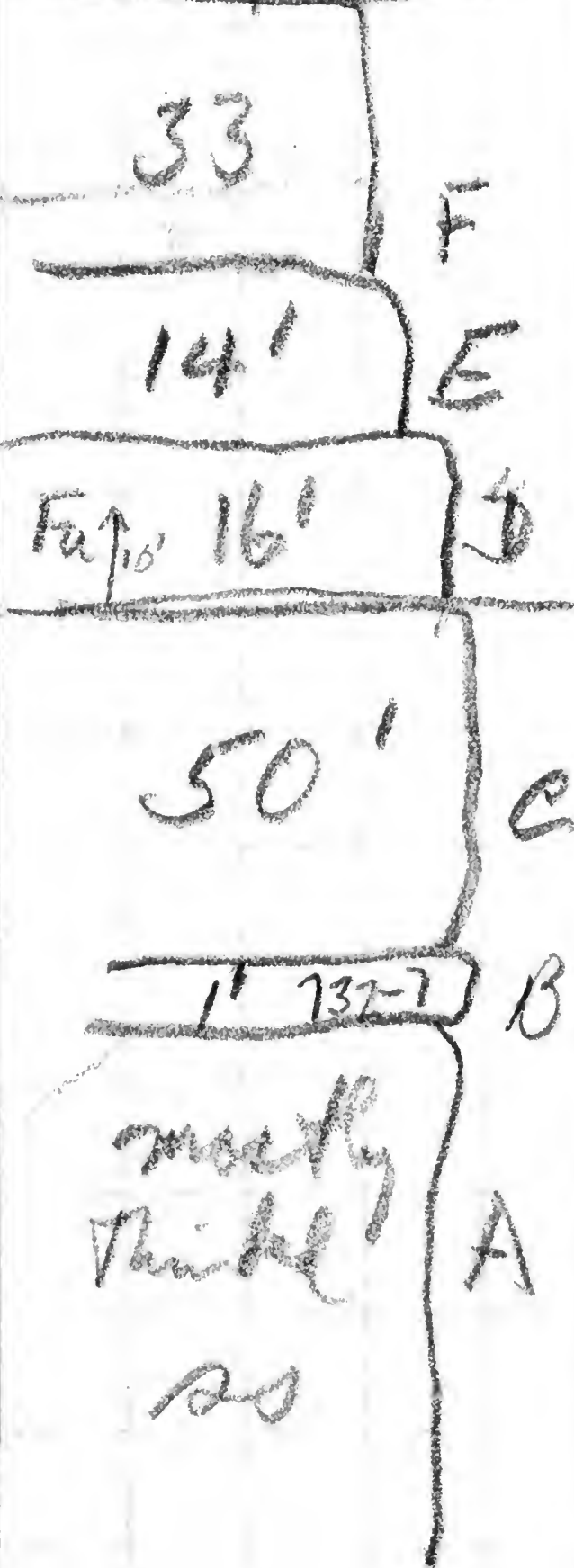


1019

(35)

A7² - Low hill with "Clay Slide" structure shaly bedded fine yellow sands and bluish sandy shale in which we saw no fossils. This is overlain by thick beds of biohermal limestone which strongly suggests Road Canyon. This limestone is about 50' thick. On its back slope is about 15' of yellow platy shale followed by about 20' of limestone, here not biohermal, but the same beds from which we collected. The biohermal arrangement here is reversed with the bioherms at the base. Saw one mass of *Coccinophora* which is good evidence for Road Canyon.

Top of hill



A7³ - High Knob.

A - mostly thin bedded sandstone with some small pebble cgl. near the bottom. Pebbles crowded and numerous, about 1'.

B - Yellow-orange to band about 1' thick containing *Perinites* and *Penicillaria*. Very like real Clay Slide = 732-7

C - 50' of slope in gray to bluish gray crumbly shales

(36)

D - conglomerate, with limestone
cobbles, very massive ls.

E - bottom half smooth gray
irregularly bedded, very fine grained,
may have been bituminous originally.

F - series of bioherms with fine
grained & chunky limestone between
one thick bed at very crest.

Coscinophora about 10' below top.

732-2 - Ammonites at 4637' in A73 Knob

732m - Knob - base of bioherms -
RC

732m - Middle Bioherms

732-0 - 10' above base of bioherms

732p - very top of Knob

732r - Coscinophora (10' below top)

732g - Lower massive member
of Capitan out in plain in
fault block. Dolomitic cream
to whitish limestone with few
fossils. A good collection could
be taken here with much work.



7

(37)

April 8

N 85 W on hill 4861

S 45 E on hill with Thick cap of R.C.

About 1 foot fusulinid limestone capped by $\frac{1}{2}$ -1" of fine grained dark limestone Both containing *Waagenoceras* and *Costispinifera*
= 7325

A8¹ - Thick sandstone probably same as that capping hill 4806.

A8² - Small Knot of biohermal limestone Rough sec. with band of cgl. beneath. It is same as top of hill 4861

fine grained ls 3'

Cherty sh. ?

5' to 10' = 732t

ls lenses

30'

+ yel. sh.

10-15'

calcareous

Bioherm 10-15'

shale

732t = hill 4861 a knob with about 25-30' of biohermal Road Canyon. Beneath is about 100' of slope of shale and shaly sandstone like that on other Road Canyon Hills to southeast. *Coscinopora* present and *Pennularia* found in float. The RC pitches steeply to the south facing hill capped by sandstone. True dip difficult to decipher. Saw *Edriostegea* in blocks with *Coscinopora*. Above this ls is more shale

38

732u is conglomerate on west side of hill about halfway up is full of fossils with *Perrinites* and *Medlicottia*, *Spirifer* etc.

Bioherm

Shale + ss
soft

Shale
+ ss
soft

732v - *Perrinites* from just above cgl. on N side hill about half way up.

732w - Brachiopod from near top of hill = *Coscinophora*

735g = Same as above but up. Cathedral Mtn.

732x - from ^{10' above} base of RC limestone which is about half way up hill. Limestone in two tiers, the lowest one 20-30' thick, variable with *Bioherms* at base, above *Bioherms* comes calcarenite often just fusulinid limestone. Bottom of hill below ls is a shale slope. Above calcarenite the limestone is in form of concretions and lenses interbedded with yellow shale, but hill is capped by 5' bed in 2 tiers of fusulinid ls. Sample 732y from here.

39

7322 - above the upper limestone
a patch of fine grained black limestone
much fragmented and containing
many ammonites

733a - Coscinophora from low
hill on SE side of 732x, y.

April 9

Big piece of 732x to Garner
have it sawed & polished

Roland Hillock

Texas Tech. Geoscience Dept.

Lubbock, Texas

April 10

Field Trip - lead 43 cars about
150 people to Decie Ranch
locality and to Hess Ranch.

1024

40

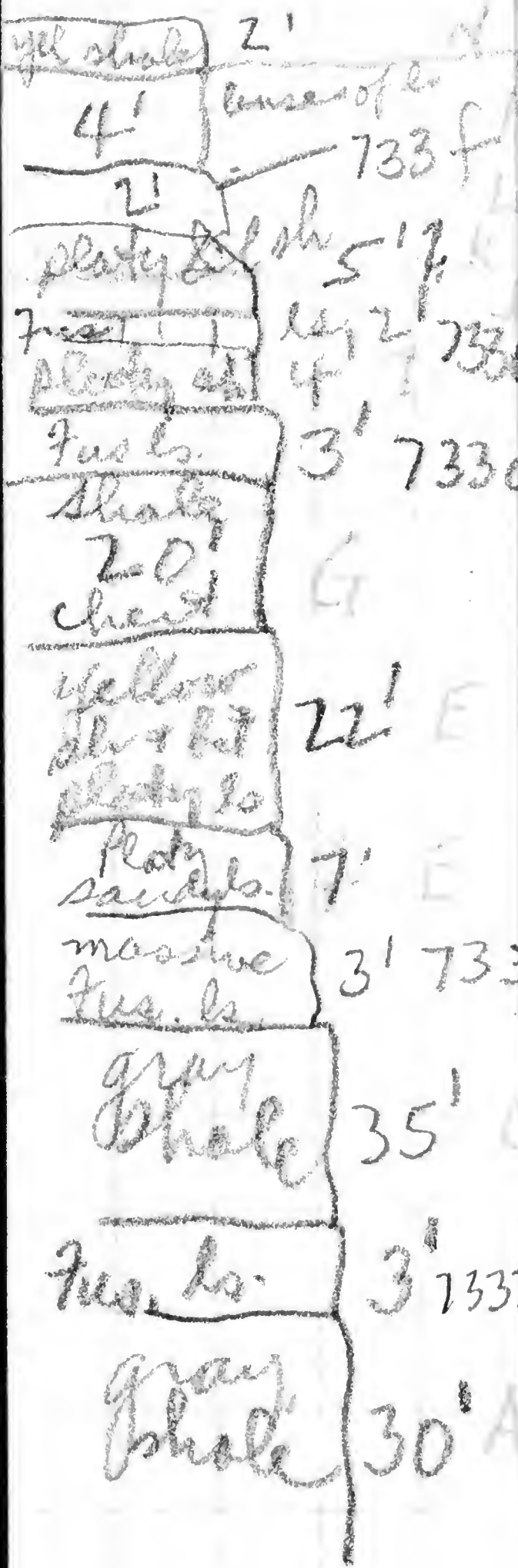
April 11

Check 7325 on home map.

7325 - *Wageroceras* and *Popenoceras* found by Furnish, et al.

7322 Ammonite bed about 2' thick crumbly smooth argillaceous ls. Above it is much flattened bituminous ls. 3-4', some hard ls about 2' followed by yellow shale capping small hill.

Under the 2' bed of ammonites is 4' feet of yellow shale which separates the ammonites from the top of the Road Canyon.



733b - Fusuline ls. 3' thick with *Megousia*.

733d - Fusuline *lœsi* and may be upper part of Hills to southwest seem to have same sequence.

733e north side hill top with platy siliceous rock above the ls.

733f - 2' crumbly shale with ammonite same as 7322

4' beds above 733f have loose fusulines at top, lime lenses with sponges and lenses of fine grained gray (bituminous) ls.

1025

(4)

Above yellow shale is long slope to a high knob - shale for 0.2 mile. Then ss in slope for about 30' vertical. This is followed by softer shale for perhaps 40' which contains occasional lenses with tiny surfaces. This is followed by ss for 27'. This is followed by shale for 50' and then ss (more massive) for 33'.

733g - Collected by G. Wilde - from bituminous concretions.

Knots of ss lie between hill with 733b-g and hill 732t, u. Some of the ss contain *Perinites*.

In morning we visited 7325 locality and all agree that it is well up in The Word. The small knots on the west side of hill 4861 are mostly in sandstone. In some of the sandstones *Perinites* was seen by Furnish and students. The low hill almost due west of 4861 contained two beds of ls separated by soft shale and was definitely Upper Cathedral Mtn. The hill is capped by Road Canyon and this is corroborated

1026

(42)

by the presence on its north slope of the same ammonite zone seen at 7322. Above this was the same fusulinid and concretarian beds as just above 7322. Above the ammonite bed we walked for about 0.2 mile in yellow platy shale to the base of the big hill. Here the platy shale gave way to soft gray shale with small lphl-like concretions like those seen on Sullivan Peak slope. It also had large bituminous concretions, some with black encrustations where fractured. The higher up we went the more sandstone we encountered in very thick beds. No float with fusulinids was seen on this very steep hill. At 7329 (which Garth had) some fusulinids were taken in concretions. Some ammonites were present but nothing that could be collected.

The Road Canyon on these hills had little Biohermal material and many of the limestones are separated by shales or cherts suggesting that here the Road Canyon may be fraying out.

1027

(43)

April 12

A12 low hill on east side Dugout Mtn.

Bluff of basal cgl. of Daise Ranch is 60' in face of hill putting base of cgl at about 4450' on slope. Dick makes the thickness in the ramp at 23 levels (=92') and 11 more (44') to top of hill.

The cgl is mostly a limestone cgl with limestone cobbles up to about a foot in diameter. In addition are chert, jasper and siliceous rock fragments ranging from sand size to 7" in diameter. So cobbles to chert cobbles about 60-40. So cobbles often tightly nested + conformable in shape. Dick suggests they were soft when deposited.

Entire top of hill is cgl. which must be at least 150 feet thick.

733h - Top of cgl but also with cgl surrounding, patch of limestone with *Gracilipella*. Other patches not examined.

Basal
SP or Top Pk

733i - 30' (guess above base of Sullivan Peak.

733j - *Coccosphora* blocks

733k - fragments 30' below *Coccosphora*
Difficult to decide if lower SP or top Pop.
Tomb.

(44)

733-2 - lens of limestone about 3' thick composed of detrital material with much broken up shells and other clastic debris. Sponges on surface. Answers to Leonard #4 and is in right place. Saw *Spiridiophora*, *Forynachus* and numerous sponges on the surface.

April 13.

0.2 E of 704

1.7 from Apple House to where we collected 733m.

Spent part of morning trying to find King Loc. 174 but got lost in The Cutacous.

Afternoon collected for 2 1/2 hours at 7264. Took two blocks called 733m which I hope contain R. occidentalis. This species is common in the lower part of the cobbly and shaly beds just above the lower bihermal part of the Cathedral Mtn. Scattered biherms also occur in these shales.

Later in afternoon showed down boys the 706 b and 706 e localities on Hess Ranch.

1029

(45)

April 14

Apple Ranch is 0.4 mile NE of site of Old Word Ranch.

Walked ridge under upper part of Road Canyon. At 703 there are 40' of slope in platy bituminous ls and 30 feet of slope in dolomite that has big ls. boulders in base (all dolomitized) and is biohermal and very massive. 703 is nearer Old Word Ranch I think than we have given it. It is 30 feet below the hill top at this place and occurs in the platy Road Canyon at the base of the dolomite massive.

733m - Fusulines from about 20' below top of hill in about middle of platy Road Canyon. Also saw *Liotella*, *Pinnularia* and *Coccinophora*. Enormous thick bioherm here which fingers into the limestones.

733o - 17 feet (vertical) under bioherm on nose of hill. Fusulines in a 2' mass or lens. Lenses capped with siliceous skins just under bioherm (about 15' above 733o) = 733p

No bioherms were seen at top of Road Canyon from ledge with *Goniatites* up to Apple place.

1030

(46)

No bioherms were seen at the base of the Road canyon from the goniatite locality to the west clear to the end of the hill. The first Upper RE bioherm is opposite Old Word Ranch near the end of the ridge marking 703a.

The bioherm with goniatites at base is the first one W of Old Word Ranch and is about 0.25 mile west.

733r - same type of rock as HR

733s - light massive ls. with fusulines extends up hill on S side small divide. I think it must be the same bed as the white ls. on the low hill on the NE side of Leonard Mtn.

Visited west end of hill 5305. At saddle soft layers contain blocks like H.R. Near base of hill a thick light-colored limestone can be traced over the saddle. It strongly suggests the Schwagerin crinoid beds of Leonard Mountain.

1031

(47)

April 15

at 584° E of Hess Ranch we are on the large *Coccinophora bichum* of which I have a slide. *Coccin.* extends half way up in the bichum and is then cut off.

	1	N
	15'	M
	4'	L
	10'	K
	16'	J
	5'	I
733u	3'	H
	15'	G
	7'	F
	35'	E
733v	3'	D
	6'	C
	11'	B
	con. 2'	A

A - *Coccinophora bichum*

B - light gray bichum sponges

C - covered

D - Massive flat bed with siliceous skins. *Fusulines* = 733v.

E - 35' light gray thick bedded limestone

F - Darker gray bedded limestone with 2" chert on top.

G - Mostly covered but from flat thin bedded siliceous shale and thin limestones

H - Massive bed limestone = 733u
cgl with cherty & siliceous masses
I - cherty brown shale

J - massive bichumal limestone

K - yellow platy siliceous shale

L - 3'-4' ledge of light gray ls with fossils & siliceous masses

M - 15' siliceous shale capped by one foot band of limestone = N
Lenses of ls occasional in this interval This is an excellent place to collect. *Paraceltetes* in bed N.
Demianaris in lenses of M.

1032

(48)

April 15

A15 - Spent morning on large boulder with *Coscinophora* just east of the huge one just N of Leonard Mtn. The *Coscinophora* are only in the bottom half of the boulder and are then cut off. Saw few fossils above them.

Looked for ammonites between the upper and lower boulders. Bed E is mostly fine granular limestone, calcarenite, with numerous well preserved fusulines. This bed has the same lithology as that seen at 726c where we found *Perrinites* and is about the same zone.

We did not get precisely to 721r but it seems unlikely that any fossils from this hill could be Cathedral Mountain. All slopes below the Road Canyon are well covered. I feel absolutely sure that 721r is wholly Road Canyon.

A15 is just west on the nose and is separated from 733t, u, v, by a gully

10 33

Glass

Mtns.

(49)

Pictures

B & W #1 - Views on faulted area just S of Horst. to 20 views at 7260 and The Hess 21-31 views at Wend W3 at Billiland Canyon and of top of SKR on hill 5280 To end views from King loc. 104 looking at east end of Horst.

#2 Dacie Ranch looking at hill 5300 from East - 9 Sullivan Peaks; 10-15 Road Canyon and Word #4 on Hess R. 16-25 Dugout Mtn. north slope Leonard 2 & 3. 26-28 - NW of Dugout Mtn. 29 & 30 Wolfcamp Hills. To end Dugout Mtn. knob with Ammonites

#3 - 1 - Dugout Knob with ammonites to 18 - Dugout Mtn - east side - one looking NW at high Word section, 19-20 - Apple Ranch April 13. 21-25 Apple & Hess Ranches, 7260 on 25. To end of roll on Crown Mtn Ranch Coeloceras beds.

(5) Color - Roll 1 - Glass Mtns. views of Hess just NE of Hess Ranch from ridge N of ranch, Leonard Mtn.

Color #2 - Views on faulted area opposite Horst to 12 views at 7260 and Hess Ranch 13-23 views of end of outcrop of W3 in Sulliland Canyon and of top of SKR on hill 5280 up to 32 - views from King 104 looking into Horst. To end Decie Ranch.

#3 - 0-3 Decie Ranch, 4-9 Sullivan Peak 10-18 - Road Canyon & Word #4 on Hess Ranch 19 - end Dugout Mtn.

#4 - 0-7 Dugout Mtn (mostly flowers) 8-19 - NW of Dugout Mtn (mostly flowers) 20-25 Field trip of April 10. To end Dugout knob with ammonites.

#5. 1 - Dugout knob with ammonites To 23 - Dugout Mtn east side - To finish Hess and Apple Ranches April 13th.

#6 - 1-3 Hess Ranch, 4-6 Apple & Hess Ranches (7260 on 6). To 23 on down Mtn, Ranch mostly Road Canyon and Coscinophora

1035

(52)

Bloches 1965

721u	- - - - -	7
7260	- - - - -	6
723v	- - - - -	1
707ha	- - - - -	3
706b	- - - - -	1
732c	- - - - -	1
732e	- - - - -	1
722-l	- - - - -	6 5
732j	- - - - -	3
733j	- - - - -	2
733m	- - - - -	2
706e	- - - - -	2
733r	- - - - -	1 2
733g	- - - - -	1
726n	- - - - -	2
		<u>39</u>

41

5090 pounds

③

Big Bend Area of Texas
Texas Geogr. Soc. Vol 1, No 1
Dallas, 1937.

April 16.

Packed all blocks, bundled all bags and packages to total of 48. They weighed 5090 pounds.

April 17

Shipped fossils by 10 AM. Then went down to Big Bend Park. We were unable to get lodging there so went on to Presidio. Trip up the Rio Grande was spectacular.

April 18

From Presidio went down Rio Grande to Texas 118 to Alpine. Some fine volcanic scenery along this route. Arrived in Madera about 3:00 P.M. Saw Russell White in evening but were denied permission to visit his place because of lambing season. We visit Mrs. Johnson for permission to go to Ojo Bonito.

Synell

1037

54

April 19.
Mr. Rudolph White, 700 West 4th St
Marfa, Texas Abolo Ranch.

Mrs. Lorraine Love Johnson
4th and Plateau, Marfa, Texas

In morning called on Mrs. Johnson for permission to visit Area NW of Ojo Brinton. After considerable discussion she lead us to the place and we found the locality with ease. There a cuesta faces southeast with a bold face. In front of this are dark shales of the Alta formation that form the flat in front of the cuesta. These pass up into a thick series of sandstones. The sandstones make up nearly the entire face of the cuesta except for the top. On the crest of the hill and on the NW slope for about $\frac{1}{3}$ the distance down the slope are greatly altered imbedded, massive limestone which suggests brohemian like those seen in Alta creek forming the bluff along the creek. Farther down the hill

Thin bed
ls +
chert
Biohermal
ls
ss
shale

(55)

Comes Thin bedded lime stone and thin bedded dark chert upward considerable platy Thin black shale appears. This rock which is suggestive of The beds above The bioherms at Cibola creek extends to base of hill where it is in contact with yellow brown siliceous, Thin-bedded rock strongly suggestive of The word. The dark thin-bedded rock above The "bioherms" contains Thin layers of limestone and some concretions both often with numerous fusulinids but no other good fossils were seen.

The topmost yellow beds also contain large black limestone concretions but they are without fossils.

These beds are on The south part of The W.E. Love Ranch which is called The Dipper Ranch.

1039

April 20

Northwest of Ojo Bonito

Section along a line N 70° W - dip = N 10° E 38° N

Went back to Permian NW of Ojo Bonito. Walked long section near west end and and on north side of road. This section started at road which ran on the contact of the "biohermal beds" and the lower cherts and went on through the latter into the word type and beyond this into dark thin shale capped by a conglomerate which we think is Cretaceous.

cgl

200' A

1/2' B

595' C

170' D

120' ^{"Biohermal"}
E

A - Thin platy black shale, sandy, with some black ls. concretions. Occupied an interval of 166 paces = 415 feet = about 200' vertical.

B - 1/2 foot limestone band with large fusulines and a few brachiopods = 7332.

C - An interval of 474 paces of yellow brown ss and siliceous shale with occasional gray ls. lenses, one about 40' from the base is of spiculite = 7340. This equals a vertical thickness of about 595'.

D. — Black Thick-bedded chert passing upward into thin-bedded, black sandy shale — covering an interval of 136 paces = about 170 feet vertical. Fusulinids 40' below top = 734b. Distinguish the so-called bioherm zone at about 120' thick on the larger hill. In the upper part here on the south side of the road we found ammonites, poor but common, in limestone masses. = 734c.

Fusulinids 734d taken about 50' below base of Word type rock about 1/2 mile east of preceding section.

7334 — Chert fusulinids taken on southwesternmost hill and on east side creek at west end of section.

April 21

734e - About 75' above the Hueco
on east hill of Baylors, 2.5 miles
N of Van Horn. = same loc. as 725c

April 22.

0.55 mile north of Hueco along
Piedmont. Part of afternoon
spent at Texas Western College.

April 23.

Charles L. Thomas had Apple Ranch
in 1945.

April 24

741j

A24 - Small conical hill 1/4 mile
West on old US 62-180 of Hueco
Dnn. About 25' - 40' above
Ponwaw cgl. Mollusc-fusuline
beds.

741b

A24' - On North side US 62-180,
near top of hill, 1.55 miles west
of Hueco Dnn. About 10' above
Ponwaw cgl.

741c

A24² From "bickern" near Alacran
Peak

741d

A24³, across gulley, S. of bickern,
small slab w/ Kozlowskia

741e A24⁺ - Wellauella beds below
Grant reef.

741f A24⁵ - NW side Cerro Alto where
lower Hueco & intrusive meet.

741g A25 u Crest of Northernmost
hill, on N. side of road, in Upper
Hueco (coarse calcarenite w/
crin. cols.) ca 0.2 mi. west
of line intersection Jim Tank &
~~Dotty Tank~~
Daily

Carlos Perez Manager
171 Maryland
El Paso

~~Bob Anderson~~

General
Manager

Joe Mims
P.O. Box 1000
Roswell N. Mex

1043

741h A26 - South side gully
with Grant Reef, South of
Alacran Mtn. Ledge below
Reef level.



4

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